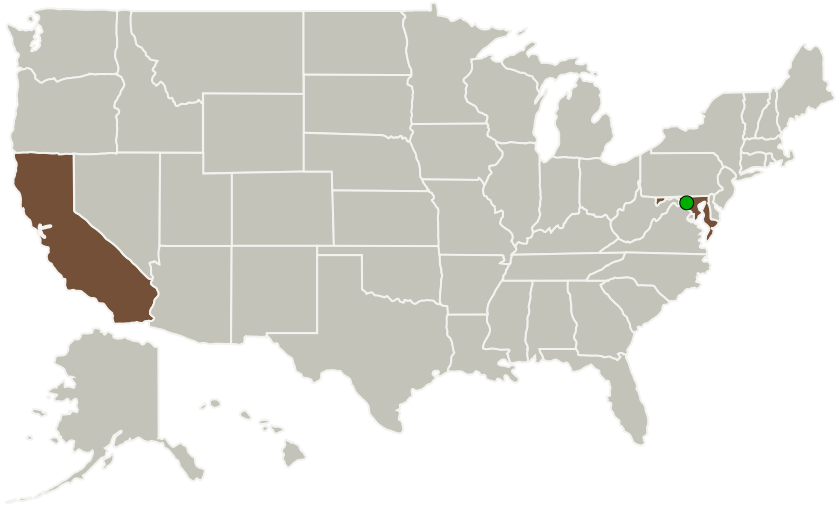
Highly Efficient FUV Photodetector with AlGaN Nanowire Photocathode, Phase II

Completed Technology Project (2010 - 2012)

Project Introduction

To address the NASA GSFC need for significant improvements in wide bandgap materials and detectors for UV applications, Physical Optics Corporation (POC) proposes to develop a new AlGaN nanowire photocathode for Silicon Microchannel Plate solar-blind photodetector fabricated directly on the MCP entrance plane. This innovative photocathode and the technology of its growth on the Si microchannel plate enables us to meet NASA requirements for windowless operation in the FUV range with high quantum efficiency, low noise, radiation-hardness, reliability, and potentially low cost. In Phase I, POC demonstrated the technology of GaN and AlN nanowire growth by Hydride Vapor Phase Epitaxy and investigated the properties of nanowire surfaces. In Phase II, POC will optimize this technology for fabrication of an AlGaN nanowire photocathode on a silicon MCP structure and demonstrate photodetector operation in the FUV range. This innovative, efficient, solar-blind, and radiation-hard UV photodetector with low background noise and a large sensing area will offer NASA capabilities to design new instrumentation with improved sensitivity and spatial or spectral resolution for FUV and UV instruments for several missions devoted to a better understanding of the origin of the Universe and its evolution to modern form.

Primary U.S. Work Locations and Key Partners



Highly Efficient FUV Photodetector with AlGaN Nanowire Photocathode, Phase II

Table of Contents

Highly Efficient FUV Photodetector with AlGaN Nanowire Photocathode, Phase II

Completed Technology Project (2010 - 2012)

Organizations Performing Work	Role	Type	Location
Physical Optics Corporation	Lead Organization	Industry	Torrance, California
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

March 2010: Project Start

March 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139085)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Physical Optics Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

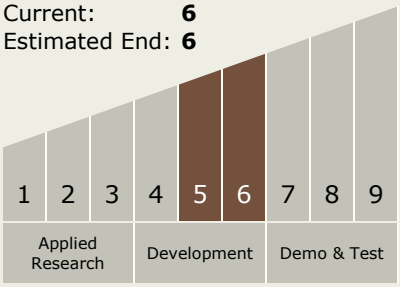
Carlos Torrez

Principal Investigator:

Paul Shnitser

Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



Highly Efficient FUV Photodetector with AlGaN Nanowire Photocathode, Phase II

Completed Technology Project (2010 - 2012)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System